

**PCT**WORLD INTELLECTUAL PROPERTY ORGANIZATION  
International Bureau

## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7: <b>B65D 43/16, 81/34, 81/38</b>	<b>A1</b>	(11) International Publication Number: <b>WO 00/21849</b> (43) International Publication Date: <b>20 April 2000 (20.04.00)</b>
(21) International Application Number: <b>PCT/GB99/03338</b> (22) International Filing Date: <b>7 October 1999 (07.10.99)</b> (30) Priority Data: 9822101.3      12 October 1998 (12.10.98)      GB 60/110,660      2 December 1998 (02.12.98)      US 9901176.9      20 January 1999 (20.01.99)      GB (71)(72) Applicant and Inventor: <b>CLARKE, Kevin, William, Joseph (GB/GB); Yaffies, Clewens Lane, Waltham Chase, Nr Southampton, Hampshire SO32 2LP (GB).</b> (74) Agent: <b>BROOKS, Nigel; Hill Hampton, East Meon, Petersfield, Hampshire GU32 1QN (GB).</b>	(81) Designated States: <b>AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</b>  Published <i>With international search report.</i>	
(54) Title: <b>THERMALLY INSULATED MICROWAVE COOKING CONTAINER</b>		
(57) Abstract		
<p>A container comprising an inner thermoformed vessel (1) and an outer thermoformed vessel (2), arranged the one within the other. The side walls (9) of the outer forming (2) surround the side walls (10) of the inner forming (1). The outer side walls has inwardly projecting ribs (11), which abut the inner side walls (10) to maintain an air gap (12) between the formings, with the formings being centred with respect to each other. The air gap is present between the bases (13, 14) of the inner and outer formings, with the outer forming being provided with ribs in its base also. In use food in the container can be heated in a micro-wave oven until hot. The air gap separates a handler's fingers from direct thermal contact with the hot food so that the container remains comfortable to handle.</p>		

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	ME	The former Yugoslav	TM	Turkmenistan
BF	Burkina Faso	GR	Greece		Republic of Macedonia	TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	ID	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's	NZ	New Zealand		
CM	Cameroon		Republic of Korea	PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakhstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

WO 00/21849

PCT/GB99/03338

## THERMALLY INSULATED MICROWAVE COOKING CONTAINER

The present invention relates to a container, particularly, though not exclusively, a disposable container in which food can be heated.

5

It is known for food to be heated in plastics material containers in micro-wave ovens and indeed conventional ovens, provided the melting point of the material is sufficiently high.

10

Polypropylene is generally an economic material to make containers from. However, a simple container suffers from the inconvenience that when containing hot material, it conducts the heat to fingers holding it.

The object of the present invention is to provide a container having a degree of thermal insulation in its side walls.

15

According to the present invention there is provided a food packaging container comprising:

a first plastics material vessel;

20

a second vessel arranged with its side wall(s) surrounding the side wall(s) of the first vessel;

projecting ribs on the sides and/or bases of either the first vessel or the second vessel or both vessels, the ribs being outwardly projecting on the first vessel and/or inwardly projecting on the second vessel, whereby heat from the contents of the container, i.e. within the inner, first vessel, does not directly heat the entire wall(s) of the outer, second vessel.

25

Preferably the two vessels are secured together. While this securement can be by inter-engagement of the rims of the vessels, it is preferably by bonding connection of the vessels, conveniently at their bases.

30

The bonding can be by means of adhesive. Alternatively, it can be by welding. Preferably the welding is at the ribs in the base of either vessel.

WO 00/21849

2

PCT/GB99/03338

Conveniently the first vessel may be provided with an integral lid connected to a rims of the vessel by a living hinge. The lid would be shaped at its edge to co-operate with the rim of the vessel so that the lid remains closed. Alternatively a lid may be provided on the second vessel.

5

Usually both vessels will be manufactured from polypropylene material. While both forming may be of a translucent grade or a coloured grade, typically the inner one will be of a translucent grade, while the outer will be of a coloured grade.

10 To help understanding of the invention, two specific embodiments thereof will now be described, by way of example and with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a container of the invention when open;

Figure 2 is a cross-sectional end view of the container when closed on the line

15 II-II in Figure 3;

Figure 3 is a cross-sectional plan view of the container on the line III-III in Figure 2;

Figure 4 is a top view of another container according to the invention;

Figure 5 is a side view of the container of Figure 4;

20 Figure 6 is a top view of a variant of the container of Figure 4;

Figure 7 is a side view of the container of Figure 6;

Figure 8 is a top view of a second variant of the container of Figure 4; and

Figure 9 is a side view of the container of Figure 8.

25 Referring to Figures 1 to 3 of the drawings, the container there shown is a two compartment container for take-away food to be heated in a microwave oven.

The container has an inner thermoformed vessel 1 and an outer thermoformed vessel 2, arranged the one within the other. Both formings 1,2 are of polypropylene  
30 material, the inner one being of a translucent grade and the outer of a coloured grade.

The inner forming has an integral lid 3 connected to a rim 4 of the forming by a living hinge 5. The lid is conventionally shaped at its edge 6 to co-operate with the rim 4 so that the lid remains closed. The rim and lid are provided with tabs 7, 8 to be

RECTIFIED SHEET (RULE 91)  
ISA/EP

WO 00/21849

3

PCT/GB99/03338

grasped for opening of the lid. This lid is optional and on embodiments not shown may not be present.

Side walls 9 of the outer forming surround the side walls 10 of the inner forming. The outer side walls have inwardly extending ribs 11, which abut the inner side walls to maintain an air gap 12 between the formings with the formings being centred with respect to each other. The air gap is present between the inner and outer bases 13, 14, with the ribs extending across the outer base.

At four spaced positions 15 on the ribs in the outer base 14, the inner base 13 is ultrasonically welded to the outer base.

In use, the food in the container can be heated in a micro-wave oven. When the container is subsequently handled the air gap separates the user's fingers from direct conductive thermal contact with the hot food so that the container remains comfortable to handle.

Referring now to Figures 4 and 5, the container 100 there shown is also a container for take-away food to be heated in a micro-wave oven. This container has an inner thermoformed vessel 101 and an outer thermoformed vessel 102 arranged one within the other. Both formings 101, 102 are also made from polypropylene material. Again the inner vessel has an integral lid 103 connected to a rim 104 of the forming by a living hinge 105. This lid is optional and not necessary to the functioning of the insulation of the vessel.

25

The base 114 of the outer forming 102 has inwardly extending ribs 115 which abut the base 113 of the inner forming 101 maintaining an air gap between the formings. At at least four positions (not shown) on the ribs, the inner forming 101 is ultrasonically welded to the outer forming 102. The side walls 109, 110 of the inner and outer formings are angled such that they converge at their rims 104 maintaining an air gap between the two formings. As above after heating of food placed in this container, the outer surface of the vessel is cool to the touch as it is not in direct conductive thermal contact with the hot food.

WO 00/21849

4

PCT/GB99/03338

Turning now to Figures 6 and 7, the container 200 thereshown is similar to the one shown in Figures 4 and 5, except that the inner forming 201 includes a divider 216. Similarly with the container 300 shown in Figures 8 and 9, the container thereshown includes two dividers 316, 317 to allow three separate foods to be heated  
5 in the same container. Again the lids in the container are not essential to the functioning of the invention.

The invention is not intended to be restricted to the details of the above described embodiment. For instance, the container could be a cup or bowl. Not only  
10 can the translucent and coloured materials of the formings be changed, but also other plastics materials can be used.

WO 00/21849

5

PCT/GB99/03338

CLAIMS:

1. A food packaging container comprising:
  - a first plastics material vessel;
  - a second vessel arranged with its side wall(s) surrounding the side wall(s)  
5 of the first vessel;
  - projecting ribs on the sides and/or bases of either the first vessel or the second vessel or both vessels, the ribs being outwardly projecting on the first vessel and/or inwardly projecting on the second vessel, whereby heat from the contents of the container, i.e. within the inner, first vessel, does not directly  
10 heat the entire wall(s) of the outer, second vessel.
2. A container as claimed in claim 1, wherein the two vessels are secured together.
3. A container as claimed in claim 2, wherein the securement is by inter-engagement of rims of the vessels.
- 15 4. A container as claimed in claim 2, wherein the securement is by bonding connection of the vessels
5. A container as claimed in claim 4, wherein the bonding of the vessels is at their bases.
6. A container as claimed in claim 4 or claim 5, wherein the bonding is by means  
20 of adhesive.
7. A container as claimed in claim 4 or claim 5, wherein the bonding is by means of welding.
8. A container as claimed in claim 7, where the welding is ultrasonic welding.
9. A container as claimed in any preceding claim, wherein the first vessel is  
25 provided with an integral lid connected to the rim of the vessel by a living hinge.
10. A container as claimed in claim 9, wherein the lid is shaped at its edge to co-operate with the rim of the vessel so that the lid remains closed.
11. A container as claimed in any one of claims 1 to 8, wherein a lid is provided  
30 on the second vessel.
12. A container as claimed in any preceding claim, wherein the vessels are of polypropylene material, the first vessel of a translucent grade and the second vessel of a coloured grade.

WO 00/21849

6

PCT/GB99/03338

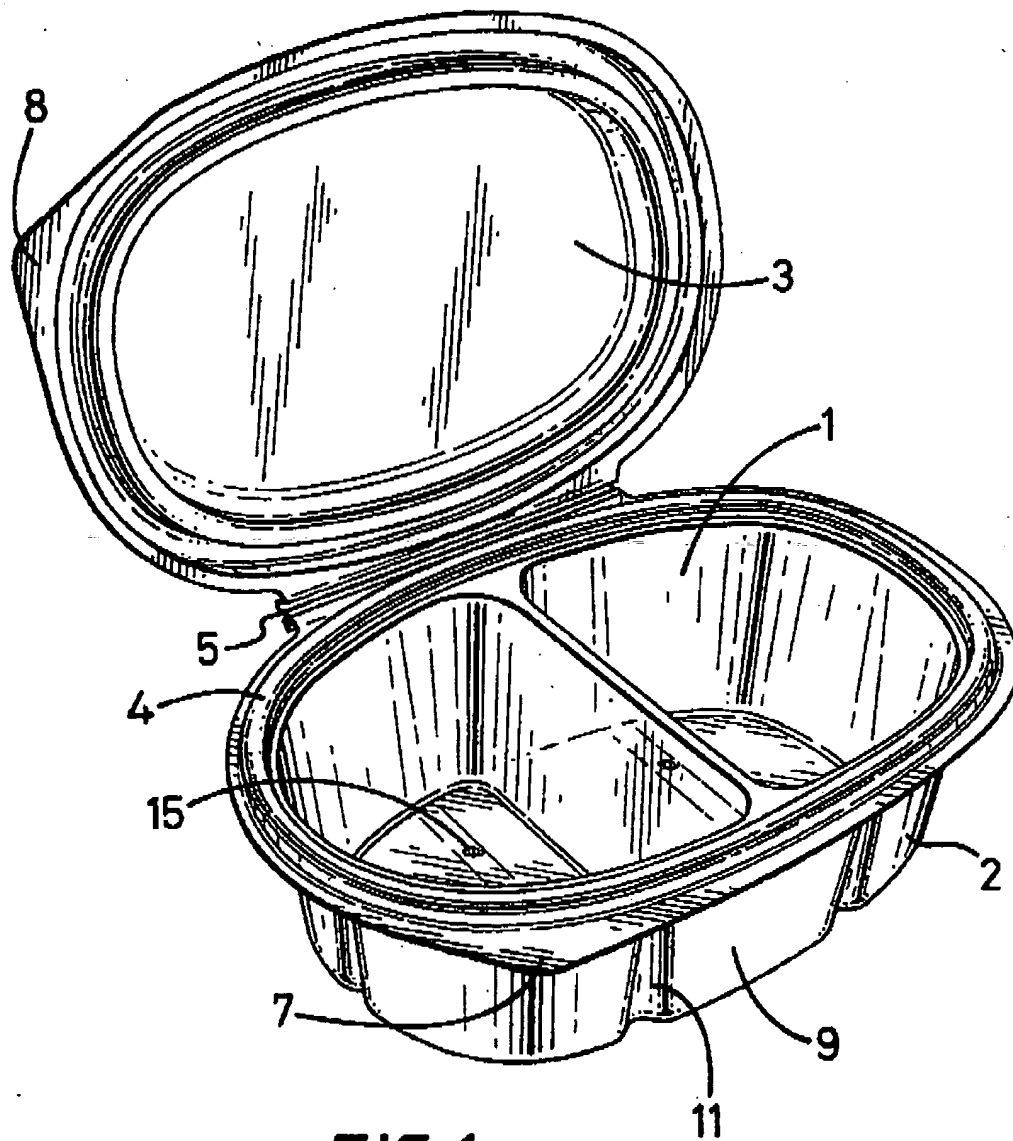
13. A container as claimed in any preceding claim, wherein the side walls of the first and second vessels are angled such that they converge at their rims, maintaining an air gap between the two vessels.
14. A container as claimed in any preceding claim, wherein the first vessel  
5 includes one or more dividers such that more than one foodstuff can be heated in the same container without contamination.



WO 00/21849

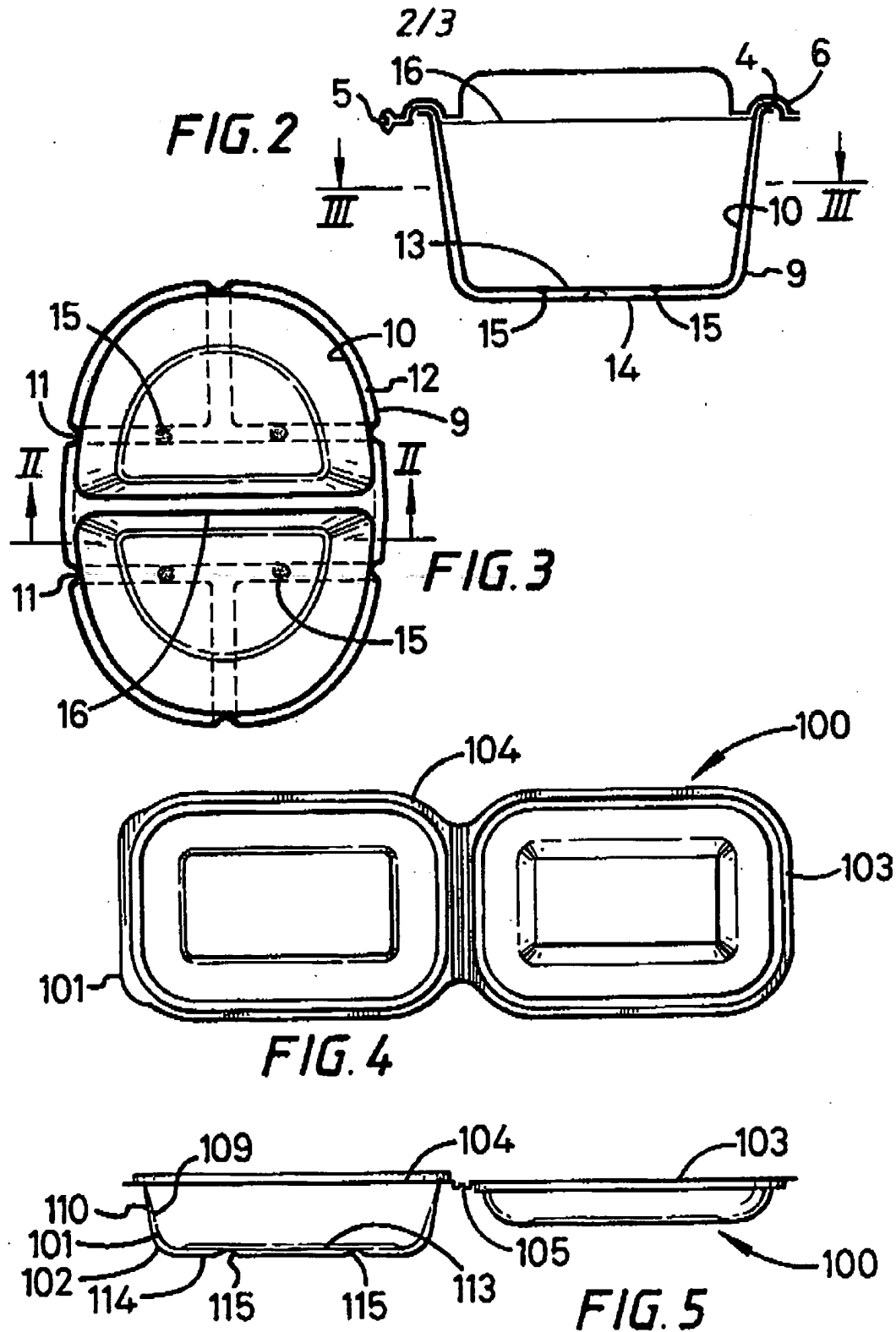
PCT/GB99/03338

1/3

**FIG. 1**

WO 00/21849

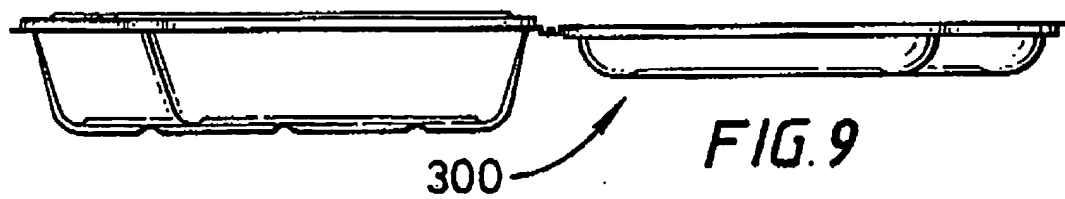
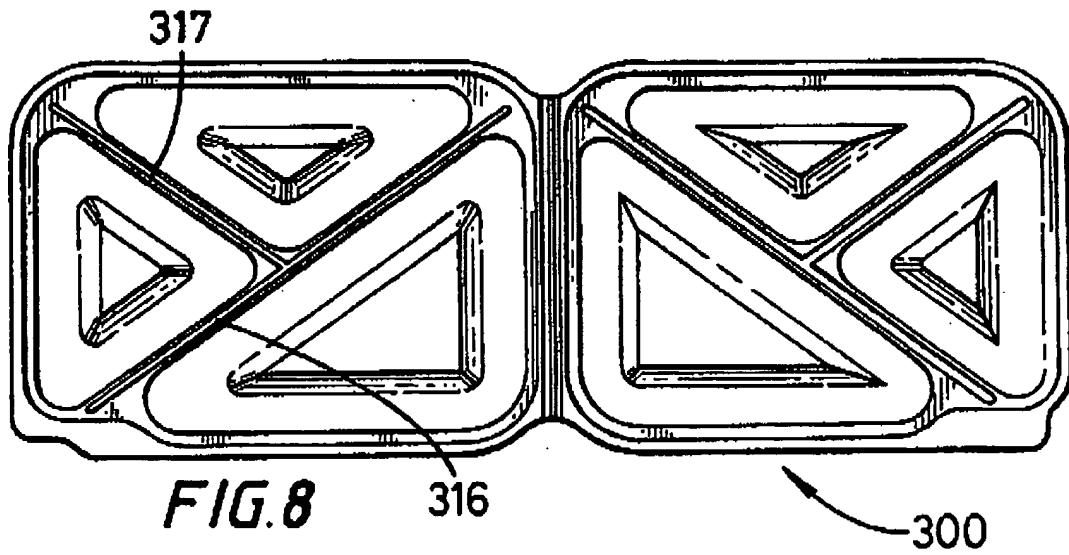
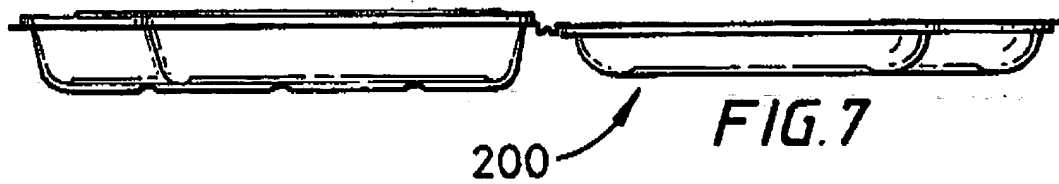
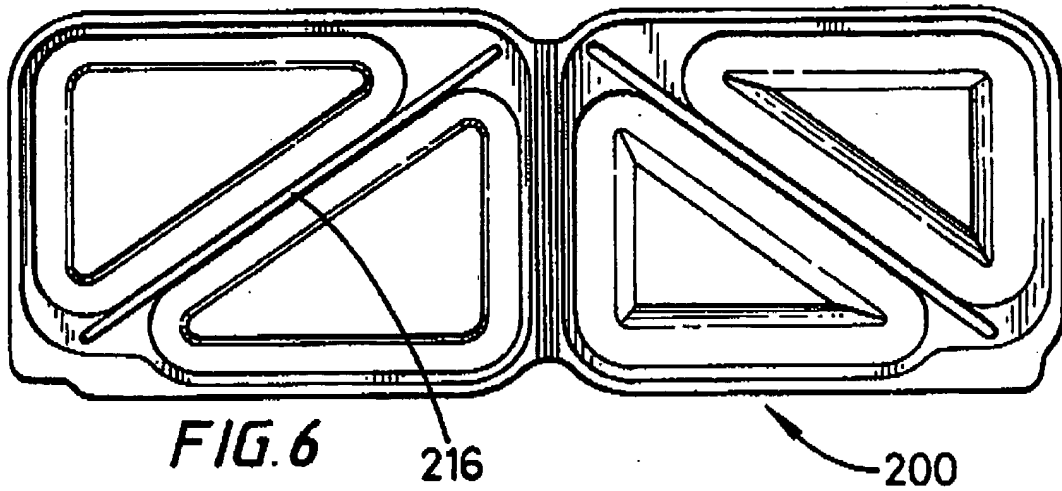
PCT/GB99/03338



WO 00/21849

PCT/GB99/03338

3/3



## INTERNATIONAL SEARCH REPORT

Inter. and Application No  
PCT/GB 99/03338

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 B65D43/16 B65D81/34 B65D81/38

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 242 701 A (BENTZ & SOHN MELITTA) 28 October 1987 (1987-10-28)	1, 2, 4-7, 13, 14
Y	the whole document	3, 8-11
Y	EP 0 509 664 A (MOBIL OIL CORP) 21 October 1992 (1992-10-21)	3, 11
X	the whole document	1
Y	GB 2 194 515 A (WADDINGTONS CARTONS LTD) 9 March 1988 (1988-03-09) page 1, line 77 - line 89	8
Y	US 5 318 810 A (NISSEL FRANK R) 7 June 1994 (1994-06-07) the whole document	9, 10
	-/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"Z" document member of the same patent family

Date of the actual completion of the international search

20 January 2000

Date of mailing of the international search report

31/01/2000

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Telex 31 651 epo nl,  
Fax: (+31-70) 340-3018

Authorized officer

Pernice, C

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 99/03338

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 201 400 A (SMITH BROTHERS) 1 September 1988 (1988-09-01) the whole document	1-14
A	US 5 300 748 A (COLOMBO EDWARD A) 5 April 1994 (1994-04-05) the whole document	1-14

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/03338

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0242701 A	28-10-1987	DE 3613298 A	22-10-1987
		AT 56601 T	15-10-1990
		AU 7172287 A	22-10-1987
		BR 8701851 A	26-01-1988
		CA 1270909 A	26-06-1990
		DK 177387 A	20-10-1987
		JP 63011115 A	18-01-1988
		NO 871558 A	20-10-1987
		US 4847459 A	11-07-1989
EP 0509664 A	21-10-1992	US 5266763 A	30-11-1993
		AT 131127 T	15-12-1995
		CA 2064968 A	17-10-1992
		DE 69206464 D	18-01-1996
		DE 69206464 T	04-07-1996
		DK 509664 T	05-02-1996
GB 2194515 A	09-03-1988	NONE	
US 5318810 A	07-06-1994	AT 130270 T	15-12-1995
		AU 655894 B	12-01-1995
		AU 4471593 A	14-07-1994
		DE 69300815 D	21-12-1995
		DE 69300815 T	15-05-1996
		DK 605081 T	18-12-1995
		EP 0605081 A	06-07-1994
		JP 6226833 A	16-08-1994
		MX 9305131 A	30-06-1994
		NO 933224 A	01-07-1994
		ZA 9306089 A	14-03-1994
GB 2201400 A	01-09-1988	AT 91475 T	15-07-1993
		CA 1296677 A	03-03-1992
		DE 3882254 A	19-08-1993
		DK 96788 A	25-08-1988
		FI 880844 A	25-08-1988
		GR 89300096 T	31-10-1989
		MX 167873 B	19-04-1993
		NO 880777 A,B	25-08-1988
		NZ 223615 A	26-10-1990
		PT 86817 A,B	28-02-1989
		AU 1212588 A	25-08-1988
		AU 7639191 A	08-08-1991
		DE 3739432 A	01-06-1989
		EP 0283145 A	21-09-1988
		IN 170414 A	21-03-1992
		JP 63272659 A	10-11-1988
		US 4994638 A	19-02-1991
		US 5101611 A	07-04-1992
US 5300748 A	05-04-1994	NONE	

Form PCT/ISA/210 (patent family annex) (July 1992)